1 *Beneficial Use*
of Coal Combustion Byproducts (CCB)
OHIO

2 *ORC 1513.02 (A)(7)*

- Amended Effective March 18, 1999.
- The Chief of the Division shall "regulate the beneficial use of coal combustion byproducts at coal mining and reclamation operations and at abandoned mine lands that are regulated under this chapter and rules adopted under it."
- Ohio EPA not involved if above criteria apply.

3 *ORC 1513.02 Types of CCBs (1)*

- Flyash
- bottom ash
- coal slag
- flue gas desulphurization byproducts
- fluidized bed combustion byproducts

4 *ORC 1513.02 Types of CCBs (2)*

- air or water pollution control residues from a coal-fired electric or steam generation facility
- any material from a clean coal technology demonstration project or other innovative process at a coal-fired electric or steam generation facility

5 *ORC 1513.02 Beneficial Use Constraints*

- Use must not be in a manner that is equivalent to a disposal system or a solid waste disposal facility
- Use must be unlikely to adversely affect human health, human safety, or the environment
- Use must be unlikely to degrade existing land, air, or water quality

6 *ORC 1513.02 Beneficial Use Categories*

- Land application uses for agronomic value
- Land reclamation uses
- Discrete, Well-Defined, Controlled Uses for:
  - structural fill
  - pavement aggregate
  - pipe bedding aggregate
  - mine sealing
  - alternative drainage or capping material
  - pilot demonstration projects

7 ❑ *Land Application Uses for Agronomic Value*

- CCB application as a soil additive to create a growing medium suitable for establishment of vegetation

8 ❑ *Land Reclamation Uses*

- Neutralization of Coal Refuse
- Neutralization of Spoil
- Lining of Pit Floors for Neutralization
- Reduce Potential for AMD Formation
- Sealing of Toxic Material

9 ❑ *CCB Beneficial Use Forms and Guidelines*

- The following guidelines were developed for permitted coal regulatory sites and for no-cost and direct-negotiated AML reclamation projects constructed in conjunction with permitted coal regulatory sites.
- The guidelines will be used as a reference for projects administered solely under the Division's AML Program.

10 ❑ *The CCB Regulatory Program*

- Attachment 34
  - Standardization of submittal and of reviews
- General Guidelines
- Hydrology Guidelines
- Soils Guidelines
- Usually a significant revision if proposed through an ARP (Application to Revise a Permit)

11 ❑ *Impacts to Ground Water and Surface Water*

- Addressed through:
  - leaching tests prior to use of material
  - analysis of material (acid/base accounting)
  - permeability tests, if used for sealing
  - water quality parameter limitations
  - Ongoing water monitoring before, during and after use (monitoring can be existing sites or monitoring wells)

12 ❑ *Leaching Tests*

- Toxicity Characteristic Leaching Procedure (TCLP)

- Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, pH, Acidity, Alkalinity, Aluminum, Chloride, Sodium, Iron, Manganese, Sulfate, Total Dissolved Solids, Fluoride, Silver, Zinc

13 ☐ *Leaching Tests*

- Analyzed prior to submittal, annually, and when significant changes in CCB source or combustion/pollution control procedures.
- Maximum acceptable leachate concentrations are 30 times the primary drinking water standards for arsenic, barium, cadmium, chromium, lead, mercury, selenium.

14 ☐ *Material Characterization*

- pH, percent sulfur, potential acidity, neutralization potential, calcium carbonate deficiency (net neutralization potential)
- CCB material and any material associated with the CCB material analyzed for the above

15 ☐ *Alkaline Addition Beneficial Use*

- Requires complete acid/base accounting of the CCB material and the associated material (spoil, coal refuse, etc.)
- pH of the CCB material must be between 6.5 and and 12.5 Standard Units.
- The calcium carbonate deficiency must be more negative than –5 tons $CaCO_3$ per 1000 tons of material. (Calcium carbonate deficiency equals potential acidity minus neutralization potential.)

16 ☐ *Low Permeability Beneficial Use*

- To isolate acid-forming and toxic-forming materials or for mine sealing.
- pH of the CCB material must be between 6.5 and and 12.5 Standard Units.
- Hydraulic conductivity of the CCB material should be $1x10^{-7}$ cm/sec. A greater hydraulic conductivity may be accepted with a demonstration that the material will adequately function as a low permeability barrier.

17 ☐ *BACKGROUND WATER SAMPLING AND ON-GOING MONITORING*

- Background water sampling under seasonal conditions is usually necessary in order to characterize existing conditions before CCB material usage begins.
- After CCB material use begins, monitoring may be required for the standard parameters in addition to the parameters identified in Tables CCB-5 and CCB-6.

18 ☐ *BACKGROUND WATER SAMPLING AND ON-GOING MONITORING*

- If required, monitoring while the permit is active normally will take place quarterly but may be required to occur at another frequency determined during the review process.
- Monitoring points typically associated with active coal mine sites are, in most instances, capable of providing information on the effects of CCB material placement.

19 ☐ *BACKGROUND WATER SAMPLING AND ON-GOING MONITORING*

- Monitoring points can be existing wells, springs, seeps, mine discharges, streams, ponds, or other sites. If monitoring wells are to be used, a diagram showing the design of the wells normally will be required.
- Upgradient and downgradient monitoring points and their locations will depend upon the configuration of the CCB material placement area, the volume of CCB material placed, and the ground water and surface water conditions at the mine site.

20 ☐ *BACKGROUND WATER SAMPLING AND ON-GOING MONITORING*

- Background water sampling under seasonal conditions is usually necessary in order to characterize existing conditions before CCB material usage begins.
- The number of monitoring points needed to assess the potential impact of the CCB material on ground water and surface water will be required. In certain instances, monitoring may not be necessary and will not be required.

21 ☐ *BACKGROUND WATER SAMPLING AND ON-GOING MONITORING*

- If water monitoring is required, the description of the water-monitoring plan must include the following:
  - Identification of proposed sites;
  - Identification of additional parameters to be monitored (e.g. arsenic, barium, cadmium, chromium, lead, mercury, selenium, etc.,) based on the TCLP test;
  - The frequency of monitoring;
  - Description of the installation of, management of, and abandonment of monitoring wells;
  - Design plans for monitoring wells.

22 ☐ *The use of CCB material shall be designed:*

- to achieve an overall improvement in water quality,
- to prevent or reduce the degradation of water quality,
- or to have a benign impact on water quality.

23 ☐ *General Requirements*

- The CCB material shall not be placed within 8 feet of the regional groundwater table unless the Division approves placement within 8 feet based upon information that demonstrates that groundwater contamination will not occur.

24 ☐ *General Requirements*

- The CCB material shall not be placed within 100 feet of perennial or intermittent streams unless a stream buffer zone variance request is approved. This distance may be increased in cases involving exceptionally high value streams. At a minimum, the material shall not be placed between the high water marks of perennial or intermittent streams.

25 ☐ *General Requirements*

- CCB material shall not be placed within 100 feet of existing high-quality wetland areas. This distance may be increased if necessary.
- CCB material shall not be placed within 500 feet upgradient of a surface drinking water source or within 300 feet of a ground water source.

26 ☐ *General Requirements*

- CCB material shall not be placed within 300 feet of an occupied dwelling unless the owner provides a written waiver.
- Proposals for using CCB material must include the consent of the owner(s) of the land where the CCB material will be applied.

27 ☐ *CCBs as Soil Additives*

- Analyses for pH, Boron, Soluble Salts, Phosphorus, Potassium, Calcium, Cation Exchange Capacity
- The proposal must include an explanation of what type of CCB material is proposed for use, the rate of application in tons per acres, the method of incorporation, and the techniques to be employed in the handling of the material.

28 ☐ *CCBs as Soil Additives*

- The Division will not consider any CCB material for use in the surface materials that produces a boron analysis (hot water extraction method) exceeding 4.0 ppm or a soluble salts content (conductivity) in excess of 2.0 mmhos when mixed with the surface materials.

29 ☐ *CCBs as Soil Additives*

- If CCB materials with boron and soluble salt levels in excess of the limits are used in areas underlying surface growing media, they must be separated from the surface by a minimum of 30 inches of non-toxic material. If the CCB material is incorporated into acid-forming materials without a cap, the four (4) foot non-toxic cover is required.

30 ☐ *Public Notice Requirements*

- The addition of beneficial use of CCBs to an existing permit may constitute a significant revision and, if so, would need to meet public notification/comment requirements pursuant to Ohio Administrative Code rule 1501:13-4-06. New permit applications are required to address CCBs in the public notice.

31 ☐ *Public Notice Requirements*

- Local authorities will be contacted by the Division and given an opportunity to review and comment on the permit application and to make recommendations to the Division.

32 ❑ *Rejected Proposal*

- Proposal was for covering of slurry with large amount of CCB material from an out of state source.
- Rejection rationale:
  - ➢ Volume of CCB material constituted "disposal"
  - ➢ Out of state source was not acceptable

33 ❑ *Examples*

- Ohio Valley Coal Company D-0360
  - alkaline addition
- Rehobeth & Central Ohio Coal – capping
- Fleming – alternate resoiling
- Broken Aro
  - mine sealing
  - alkaline addition